CLAIMS

1. An immunoassay method for detecting or measuring prion protein in a sample using at least one antibody specifically binding to prion protein, comprising contacting the prion protein present with a reagent capable of improving binding of said at least one antibody to the prion protein.

2. An immunoassay method according to claim 1, wherein said reagent is a metal compound of a prion protein binding metal.

3. An immunoassay method according to claim 2, wherein said metal compound is a salt or chelate of a metal selected from the group consisting of copper, nickel, zinc and manganese.

4. An immunoassay method according to claim 3, wherein said metal salt is selected from the group consisting of $CuCl_2$, $CuSO_4$, $Cu(NO_3)_2$, $ZnSO_4$, $ZnCl_2$, $Zn(NO_3)_2$, $NiCl_2$, $NiSO_4$, $Ni(NO_3)_2$, $MnCl_2$, $MnSO_4$ and $Mn(NO_3)_2$.

5. An immunoassay method according to claim 1, wherein said reagent is an oxidation agent.

6. An immunoassay method according to claim 5, wherein said oxidation agent is hydrogen peroxide or a permanganate salt.

7. An immunoassay method according to any one of claims 1-6, wherein said at least one antibody is a detection antibody.

8. An immunoassay method according to any one of claims 1-7, wherein said prion protein is natural prion protein.

9. An immunoassay method according to any one of claims 1-8, wherein said sample is a body fluid, such as plasma or serum, cerebro spinal fluid, urine, or a tissue homogenate, such as brain homogenate.

10. An immunoassay method according to claim 9, comprising contacting the sample with a solid surface to immobilize prion protein present in the sample to said solid surface, contacting the solid surface, optionally after washing to remove components of the sample which have not been bound to the solid surface, with the reagent, contacting the solid surface, optionally after washing to remove reagent which has not been bound to the solid surface, with a detection antibody specifically binding to prion protein, and determining, optionally after washing to remove detection antibody which has not been bound to the solid surface, the presence or amount of detection antibody which has been bound to the solid surface.

11. An immunoassay method according to claim 10, wherein the immunoassay is in ELISA format.

12. An immunoassay method according to claim 11, wherein the detection antibody used carries a detectable enzyme label and wherein the presence or amount of detection antibody bound to the solid surface is determined by detecting or measuring the conversion of a substrate of said enzyme.

13. An immunoassay method according to claim 11, wherein the solid surface, after said contacting with the detection antibody, is contacted with an antibody specifically binding to the detection antibody and carrying a detectable enzyme label and wherein the presence or amount of detection antibody bound to the solid surface is determined by detecting or measuring the conversion of a measurable substrate of said enzyme.

14. An immunoassay method according to any one of claims 9-13, wherein the prion protein present in the sample is bound by adsorption directly to the solid surface.

15. An immunoassay method according to any one of claims 9-13, wherein the prion protein present in the sample is bound to the solid surface via a substance, such as a peptide or protein, having affinity for prion protein.

16. An immunoassay method according to any one of claims 9-13, wherein the prion protein present in the sample is bound to the solid surface by a catcher antibody specifically binding to prion protein.

17. An immunoassay method according to any one of claims 1-6, wherein said at least one antibody is a catcher antibody.

18. An immunoassay method according to any one of claims 1-8, wherein the sample is a cell or tissue sample, such as brain sample.

19. An immunoassay method according to claim 18, wherein the immunoassay method is in immunohistochemical, immunocytochemical or cytospin format.

20. A method of separating prion protein from a prion protein containing solution using a capturing antibody specifically binding to prion protein, comprising contacting the prion protein present with a reagent capable of improving binding of the capturing antibody to the prion protein.

21. A method according to claim 20, wherein said reagent is a metal compound of a prion protein binding metal, preferably a salt or chelate of a metal selected from the group consisting of copper, nickel, zinc and manganese, such as a

metal salt selected from the group consisting of $CuCl_2$, $CuSO_4$, $Cu(NO_3)_2$, $ZnSO_4$, $ZnCl_2$, $Zn(NO_3)_2$, $NiCl_2$, $NiSO_4$, $Ni(NO_3)_2$, $MnCl_2$, $MnSO_4$ and $Mn(NO_3)_2$.

22. A method according to claim 20, wherein said reagent is an oxidation agent, preferably hydrogen peroxide or a permanganate salt.

23. A method according to any one of claims 20-22, wherein the prion protein containing solution after being treated with the reagent is passed through a filter or affinity chromatography column containing capturing antibody immobilized to a solid carrier and wherein the prion protein depleted solution, or the separated prion protein, or both, are collected.

24. A method of determining the nature of prion protein which is present in a sample, comprising the steps of

selecting a reagent capable of improving the binding between prion protein and antibody specifically binding to prion protein,

subjecting the sample to a series of prion protein immunoassays which use the said reagent in various concentrations,

determining the EC_{50} value of the selected reagent for the prion protein contained in the sample, and

comparing the EC_{50} value obtained for the prion protein in the sample with the EC_{50} value of the selected reagent for PrP^C and the EC_{50} value of the selected reagent for PrP^{Sc} to determine the nature of the prion protein contained in the sample.

25. A method according to claim 24, wherein said reagent is a metal compound of a prion protein binding metal, preferably a salt or chelate of a metal selected from the group consisting of copper, nickel, zinc and manganese, such as a metal salt selected from the group consisting of $CuCl_2$, $CuSO_4$, $Cu(NO_3)_2$, $ZnSO_4$, $ZnCl_2$, $Zn(NO_3)_2$, $NiCl_2$, $NiSO_4$, $Ni(NO_3)_2$, $MnCl_2$, $MnSO_4$ and $Mn(NO_3)_2$.

26. A method according to claim 24, wherein said reagent is an oxidation agent, preferably hydrogen peroxide or a permanganate salt.